

Future mobile technology: channel access mechanism for LTE-LAA using deep learning

ABSTRACT

The exponential increase of future mobile phone users is resulting in growth of data traffic which is creating a shortage of the licensed spectrum. The scarcity led to the idea of using the unlicensed channel along with the licensed channel in Long Term Evolution (LTE), known as License Assisted Access (LAA). However, the unlicensed spectrum is already utilized by Wi-Fi and in order to deploy Small Base Stations (SBSs) that will also utilize the same band there is a need for a fair coexistence mechanism which will allow the SBS to be operational without degrading the performance of Wi-Fi. By adopting a deep learning approach, we can train SBSs to predict wireless traffic ahead of time. To forecast future time sequences, we use LSTM models which have already proven to be competent for time series predictions. We tested the LSTM models with high load datasets and a low load dataset that we were able to generate using a 2.4 GHz band. We obtained a RMSE of 0.041463 at the lowest for trace 3 and an MSE of 0.0017192. These results demonstrate the precision of LSTM networks for recognizing wireless traffic patterns. This concept incorporated in LTE-LAA infrastructures can result in better overall service and prove to be energy efficient than the traditional techniques such as LBT or CAA.